

REMARKS

In the above-identified Office Action the Examiner has rejected claims 2, 4 and 6 as unpatentable over Weber in view of Yoshida. The Examiner has stated that the silicon ingot is grown by Czochralski where the pull rate is adjusted or controlled during growth to create a uniform dopant and Yoshida is utilized for its teaching that a diameter of an ingot is a target to be used in controlling growth and therefore the Examiner has concluded that it would have been obvious to modify Weber with Yoshida to use the diameter in order to create a uniform ingot which creates uniform wafers. Applicant disagrees with the Examiner's rejection and rationale, noting that it has amended the claims to better bring out the distinction between the subject invention and the prior art and now believes the claims to be allowable.

The invention described in Weber only relates to suppressing the fluctuation range of the growth rate. The growth rate refers to the speed at which the crystal grows and changes from liquid phase to solid phase at the solid-liquid interface, while the fluctuation range of the growth rate refers to the fluctuation range at a time when the liquid phase changes into the solid phase. On the other hand, in the present invention, the claims now recite an instruction given to a pulling-up mechanism to control the pulling up speed at a time when the single crystal, suspended by a wire, etc., is pulled by the pulling mechanism. The fluctuation range in the pulling-up speed as used in the present invention refers to the fluctuation range of the pulling-up speed in the instruction that is given to the pulling-up mechanism.

Weber describes in paragraph [0012] the growth rate as a different concept than the pulling rate. Thus Weber describes that the pulling rate is no more than 0.8 mm/min, and particularly preferably no more than 0.6 mm/min.

In other words, the pulling-up speed in the present invention is a parameter that can be given to the motor in the instructions, while the growth rate in Weber is

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merely a physical phenomenon that is not taught by Weber to be given as an instruction.

As a result, in the present invention, the pulling-up instruction is given to increase or decrease the speed with respect to the current pulling-up speed. Thus, the center point of the fluctuation in the pulling-up speed is a value of the current pulling-up speed. On the other hand, in Weber, the center point of the growth rate is a prescribed value (target value) or average value, which is clearly described in paragraph [0009] "predetermined growth rate" and shown in Fig. 2 "average growth rate."

Additionally, the present invention determines, through calculation, the amount of increase or decrease of the pulling-up speed is needed to control the fluctuation within a prescribed range. On the other hand, in Weber, rather than determine the speed by calculation, the fluctuation in growth rate falls within the prescribed range as a result of adjusting the heat to the crystal by the rotation speed of the crucible or other various parameters (see paragraph [0012]).

Thus, Applicant adjusts the pulling-up speed by relating to the crystal diameter, and Weber adjusts growth fluctuations by relating to the heat applied to the crystal through rotation (paragraph 0012). These are two different approaches.

Applicant points out that the center point of the fluctuation range of the pulling-up speed in the present invention is the actual pulling-up speed, while the center point of the fluctuation range of the growth rate in Weber is a pre-set value, or target value, or average rate of the growth rate, i.e. growth of the crystal not the speed of the pulling-up rate.

In the present invention, to obtain the instruction for making the deviation of the crystal diameter zero, the amount of increasing/decreasing the pulling-up speed whose fluctuation width falls within the prescribed range is calculated, while, in Weber, rather than be determined by calculation, the fluctuation in the growth rate

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falls within the prescribed range only as a result of (without calculation) adjusting the rotation speed of the crucible or other various parameters.

Yoshida, first, grows a semiconductor crystal with a flattop and focuses on controlling the growth of the crystal to the diameter of the crucible by controlling the temperature. This is accomplished before the crystal is pulled up. Therefore the pulling up speed has nothing to do with the control of the crystal in Yoshida's invention, and contributes nothing to Weber.

With the above amendments and remarks, this application is considered ready for allowance and applicant earnestly solicits an early notice of same. Should the Examiner be of the opinion that a telephone conference would expedite prosecution of the subject application, he/she is respectfully requested to call the undersigned at the below listed number.

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Respectfully submitted,



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